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10/821,578

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Todd R. Martin

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HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER

RAHMAN, FAHMIDA

ART UNIT	PAPER NUMBER
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2116

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06/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/821,578

Applicant(s)

MARTIN, TODD R.

Examiner

Fahmida Rahman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/11/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-16 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This final action is in response to communications filed on 4/11/2007.
2. Claims 1, 3, 7, 9, 10, 14, 16, 18 and 20 have been amended, claims 2 and 17 have been cancelled and no claims have been added. Thus, claims 1-20 are pending.

Claim Objections

Claim 9 is objected to because of the following informalities: "the first hard disk drive storage device" in line 5 of claim 9 lacks antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4, 7, 9, 10, 12, 14-15, 16, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US Patent 7073054), in view of Sukegawa (US Patent 5860083).

For claim 1, Kim et al teach the following limitations:

A computer system (Fig 1 and Fig 2) for performing expedited startup operations (lines 55-56 of column 1), comprising: a processor (10); a system startup memory (30)

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coupled to the processor (lines 17-20 of column 2); a basic input/output system (BIOS) memory (20) coupled to the processor (Fig 1), the BIOS memory comprising instructions for initiating startup operations (lines 25-27 of column 1); and a hard disk drive storage device (40), comprising a storage media comprising at least one drive platter (42) for storing a program module ("booting program of an OS" mentioned in line 18 of column 3) that is loaded in the system startup memory during startup operations (lines 15-20 of column 1; lines 56-64 of column 2), a non-volatile memory (45) for storing a copy of the program module stored on the storage media (lines 20-26 of column 4), and a microcontroller (44) for controlling access to the storage media and the non-volatile memory (lines 30-63 of column 3), said microcontroller configured to retrieve the program module from the non-volatile memory in response to a read request from the processor if the storage media is not operational when the read request is received by the hard disk drive storage device (lines 46-63 of column 3).

The non-volatile memory of Kim et al is a flash memory. Kim et al does not mention that non-volatile memory comprises a cache memory for storing a copy of program module.

Sukegawa teaches the following limitations:

A hard disk drive storage device (1, 2, 3), comprising:

a storage media (2) comprising at least one drive platter (2 is a hard disk that has platter) for storing a program module ("control information" mentioned in line 40 of column 6) that is loaded in the system startup memory during startup operations (lines 38-41 of column 6 mention that control information read out from HDD transferred to

host to start the OS. Thus, control information is loaded from HDD to system memory during startup); a non-volatile cache memory for storing a copy of the program module stored on the storage media (lines 35-40 of column 6 mention that control information is stored in 10A, lines 45-50 of column 6 mention that 10A acts as a cache memory area. As 10A is part of flash memory, 10A is a non-volatile), and a microcontroller (3) for controlling access to the storage media and the non-volatile cache memory (lines 24-55 of column 7), said microcontroller configured to retrieve the program module from the non-volatile cache memory in response to a read request from the processor (lines 45-55 of column 6 mentions that control information is read from 10A at the time of next turning-on of power. Thus the program module is read from non-volatile cache in response to a read request from the processor).

It would have been obvious for one ordinary skill in the art at the time the invention was made to combine the teachings of Kim and Sukegawa. One ordinary skill in the art would be motivated to include cache to store a copy of program module as cache is well known for its high speed performance (lines 55-60 of column 6).

For claim 4, lines 46-63 of column 3 mention that the program module is the booting program that is loaded into main memory (lines 29-37 of column 4). As booting implies loading of OS, the OS associated with booting program is loaded for the computer system.

For claim 7, 3 is the controller for maintaining coherency between cache 10A and HDD 2, which is explained in lines 20-51 of column 9. 3 updates HDD when updates cache. Thus, coherency is maintained.

For claim 9, Kim et al teach the following limitations:

A method for retrieving a program module ("booting program of an OS" mentioned in line 18 of column 3) from a first storage device (40) during startup operations (line 61 of column 1 through line 2 of column 2), comprising: executing BIOS instructions for initiating startup operations (lines 25-27 of column 1); initiating operating system load operations (lines 15-20 of column 1; lines 56-64 of column 2) by requesting the program module ("booting program of an OS" mentioned in line 18 of column 3) from the first hard disk drive storage device (40) comprised of a first storage media (42) and a non-volatile storage media (45); and retrieving said program module from the non-volatile storage media if the first storage media is not operational to provide said program module (lines 46-63 of column 3).

The non-volatile memory of Kim et al is a flash memory. Kim et al does not mention that non-volatile memory comprises a cache memory for storing a copy of program module.

Sukegawa teaches the following limitations:

initiating operating system load operations by requesting the program ("control information" mentioned in line 40 of column 6; lines 38-41 of column 6 mention that control information read out from HDD transferred to host to start the OS. Thus, control

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information is loaded from HDD to system memory during startup) from the first hard disk drive storage device (1, 2, 3) comprised of a first storage media (2) and a non-volatile cache storage media (lines 35-40 of column 6 mention that control information is stored in 10A, lines 45-50 of column 6 mention that 10A acts as a cache memory area. As 10A is part of flash memory, 10A is a non-volatile); and retrieving said program module from the non-volatile cache storage media (lines 45-55 of column 6 mentions that control information is read from 10A at the time of next turning-on of power. Thus the program module is read from non-volatile cache in response to a read request from the processor).

It would have been obvious for one ordinary skill in the art at the time the invention was made to combine the teachings of Kim and Sukegawa. One ordinary skill in the art would be motivated to include cache to store a copy of program module as cache is well known for its high speed performance (lines 55-60 of column 6).

For claim 10, cache storage is a cache memory.

For claim 12, lines 46-63 of column 3 mention that the program module is the booting program that is loaded into main memory (lines 29-37 of column 4). As booting implies loading of OS, the OS associated with booting program is loaded for the computer system.

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For claim 14, 3 is the controller for maintaining coherency between cache 10A and HDD 2, which is explained in lines 20-51 of column 9. 3 updates HDD when updates cache. Thus, coherency is maintained.

For claim 15, the program module is executed to load OS (line 3 of column 4).

For claim 16, Kim et al teach the following limitations:

In an information handling system (Fig 1), a disk drive storage device (40), comprising: at least one drive platter (42) for storing a program module ("booting program of an OS" mentioned in line 18 of column 3), a non-volatile memory (45) for storing a copy of the program module (lines 20-26 of column 4), and a microcontroller (44) for controlling access to the drive platter and the non-volatile memory (lines 30-63 of column 3), said microcontroller configured to retrieve the program module from the non-volatile memory in response to a read request from a processor if the drive platter is not operational when the read request is received by the disk drive storage device (lines 46-63 of column 3).

The non-volatile memory of Kim et al is a flash memory. Kim et al does not mention that non-volatile memory comprises a cache memory for storing a copy of program module.

Sukegawa teaches the following limitations:

a non-volatile cache memory for storing a copy of the program module (lines 35-40 of column 6 mention that control information is stored in 10A, lines 45-50 of column 6

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mention that 10A acts as a cache memory area. As 10A is part of flash memory, 10A is a non-volatile), and a microcontroller (3) for controlling access to the drive platter (42) and the non-volatile cache memory (lines 24-55 of column 7), said microcontroller configured to retrieve the program module from the non-volatile cache memory in response to a read request from a processor (lines 45-55 of column 6 mentions that control information is read from 10A at the time of next turning-on of power. Thus the program module is read from non-volatile cache in response to a read request from the processor).

It would have been obvious for one ordinary skill in the art at the time the invention was made to combine the teachings of Kim and Sukegawa. One ordinary skill in the art would be motivated to include cache to store a copy of program module as cache is well known for its high speed performance (lines 55-60 of column 6).

For claim 20, 3 is the controller for maintaining coherency between cache 10A and HDD 2, which is explained in lines 20-51 of column 9. 3 updates HDD when updates cache. Thus, coherency is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 11, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US Patent 7073054), in view of Sukegawa (US Patent 5860083), further in view of Coulson (US Patent Application Publication 2004/0162950).

For claims 3, 11, 18, Kim, in view of Sukegawa, does not teach any battery backed CMOS memory. Coulson teaches a non-volatile memory (145) comprising cache memory (145) that further comprises battery backed CMOS memory ([0025]). Coulson further teaches a microcontroller memory (150) for storing a module that maintains coherency between the storage media and the non-volatile cache ([0040]).

It would have been obvious for one ordinary skill in the art at the time the invention was made to combine the teachings of Kim et al, Sukegawa and Coulson. One ordinary skill in the art would be motivated to use non-volatile cahce for its high speed operation. One ordinary skill in the art would be motivated to use cache coherency controller to maintaining cache coherency between cache and storage media.

5. Claims 5, 13, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US Patent 7073054), in view of Sukegawa (US Patent 5860083), further in view of Applicant's Admission of Prior Art (AAPA).

For claim 5, 13 and 19, Kim et al or Sukegawa do not teach that the initial program load module comprises an MBR and kernel. Kim et al stored a booting program, or boot loader (line 1 of column 4).

Applicant admitted that MBR, boot loader, kernel program are typical part of OS loading ([0005]).

It would have been obvious for one ordinary skill in the art at the time the invention was made to combine the teachings of Kim et al, Sukegawa and AAPA. One ordinary skill would be motivated to have IPL comprising MBR, boot loader, kernel locator (or, kernel program), since these are used to load OS. Sukegawa stored the control information necessary for starting OS (lines 40-42 of column 6) in HDD and 10A (lines 40-50 of column 6).

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US Patent 7073054), in view of Sukegawa (US Patent 5860083), further in view of Knapp, III (US patent 6996743).

For claim 6, Kim et al do not teach that the hard drive comprising RAID array. Knapp, III used RAID to store mirror program. One ordinary skill would be motivated to use RAID, as a redundant copy is available in case of failure (lines 37-45 of column 6 of Knapp).

Allowable Subject Matter

7. Claim 8 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed on 4/11/2007 with respect to claims 1, 3-7, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20 are moot in view of new grounds of rejections.

Applicant's arguments filed on 4/11/2007 with respect to claim 10 have been considered but are not persuasive.

Applicant argues that Sukegawa's hard disk drive is separate from cache 10C in the flash memory unit. Thus, cited references failed to teach the hard disk drive storage device that has both a first storage media and a non-volatile cache memory.

Examiner agrees that HDD is separate from cache in Sukegawa. However, examiner did not consider HDD as the recited hard disk drive storage device. Combination of 1, 2, 3 are the hard disk drive storage device. Combination of 1, 2, 3 has a hard disk and cache for hard disk (lines 45-50 of column 6). Thus, the combination represents the hard disk drive storage device. The HDD 40 in Kim et al comprises the non-volatile storage 45 that stores the copy of program module (line 1 of column 4).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fahmida Rahman whose telephone number is 571-272-8159. The examiner can normally be reached on Monday through Friday 8:30 - 6:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rehana Perveen can be reached on 571-272-3676. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business

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Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Fahmida Rahman
Examiner
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A handwritten signature in black ink, appearing to read 'Fahmida Rahman', with a long horizontal flourish extending to the right.

THUAN DU
PRIMARY EXAMINER